

Bonaum Tomine  
Horn.

Querela Geometrica:  
OR,  
GEOMETRY'S Complaint  
Of the Injuries lately received from  
Mr. THOMAS VVHITE  
In his late Tract,  
Entituled,  
*Tutela Geometrica.*

In the end you have some  
Places at large out of Mr. white's  
TUTELA, and Gulden's CENTRO-  
BARYCA, Reprinted, and faithfully  
Translated into English.

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LONDON,  
Printed by R. W. 1660.





The Publisher  
TO THE  
R E A D E R.

**H**aving in the following Letter from my Friend, receiv'd a brief account of Mr. Whites so much fam'd and expected Geometrical Treatise, I thought fit to publish it for satisfaction of many, very desirous to understand the success he has had therein.

Know then, that the Letter consists of two parts. The first demonstrates the many and gross Errors against Geometry, committed by Mr. White in his *Tutela Geometrica*: which yet he terms his *Chrysalpis*, or *Golden Shield*, wherewith to defend all his other Works.

The latter part lays open his most unworthy proceeding against a famous Mathematician, by charging him with many and evidently false imputations, on purpose to disgrace him. From all which he is here fully vindicated, as well in the ensuing Letter, as in the Additionals.





# *Querela Geometrica:*

O R.

## Geometry's Complaint

Of the Injuries received lately from

### TUTELA GEOMETRICA.

O R.

The Copy of a *missive, &c.*

*S. I. R.*

I Have, according to your request, perused the small Geometrical Tract lately published by Mr. Thomas White: whereof accordingly I give you here this brief account. The intent and occasion of his present Writing, as on this Subject,

A 2 — having

Having scarce hitherto appeared  
in that kinde) is (as is manifest  
by the Title) to make known to  
the world the great light he hath  
received particularly from God  
in that noble Science of Geome-  
try ; as having never studied it,  
nor much applied himself that  
way : that thereby other men,  
conceiving this so excellent a  
Piece must needs have been con-  
veighed to him by particular  
light from Heaven , may learn  
thence more to prize and esteem,  
then hitherto they have done, his  
Works already published. For  
so he tells his Reader in the end  
of his Preface, that the things he  
is now to declare , ought to be  
sufficient to give esteem to all his  
former Labours. For if (saith  
he) they came from the Author,  
and from that force and vigour of  
Wit, by which he is able to per-  
form many more equal to this,

then

then his precedent Works are not to be contemned, as proceeding from such a Father, *quia de tali exorta sunt Patre*: But if it come from Heaven, then much more are his other Works worthy consideration, to wit, as coming also from Heaven before it.

Now that they come not from himself, he openly avouches, as having never had any Master in Geometry, nor much applied himself to that Science, or read so much as *Euclide*. Yea, he freely acknowledges himself so little versed in Geometry, that he plainly affirms, no man will call him a Geometrician, if he be one himself: *Intuere me hominem, quem nemo Geometram salutes, mandò ipse sit.* Whence he concludes, that the things he is now to deliver, must assuredly come from Heaven: *Talis cum sim, non à me haec habes, sed ab eo, qui ex legibus*

Providentia sua, ea gubernationi  
 Ecclesiae sua, in hoc rerum ar-  
 ticulo, opportuna & fecit, & vi-  
 dit. Being I am such a one; (to  
 wit, so little vers'd in Geometry)  
 thou hast not these things from  
 me, but from him, who accord-  
 ing to the Laws of his Provi-  
 dence, both saw and made them  
 fit for the Government of his  
 Church, in this present conjun-  
 cture: give him the thanks, &c.  
 Wherefore he exhorts the Rea-  
 der, not to neglect his own good,  
 nor contemn a wonder fallen to  
 him from Heaven. *Quod superest,*  
*tibi consule, & ostendum a calo ad*  
*te delapsum ne contemnito.*

All this with some other such  
 expressions hath Mr. *white* in his  
 Preface; whereby you clearly  
 see, how highly he values this  
 his Tract, as fallen from Hea-  
 ven, and accordingly desires the  
 like esteem should be framed of  
 all

all his other Works: that so his Readers considering and weighing with themselves, that it is impossible so learned and subtil a work should come from one that never studyed Geometry, must necessarily conclude that it canie particularly from Heaven: and by consequence also have a better esteem, then hitherto, of his former Labours, as undoubtedly coming from the same place.

This is the aim and drift of Mr. *white* in this his *Tutela*; wherein truly he seems, by so far expressing himself, to have given a very great advantage to whosoever will impugne his former Writings. For now his Adversary hath no more to do, but to shew (as easily he may) that this Geometry never came from Heaven, and by consequence, that neither any of his former Works, (whereof Mr. *white* would have

this to be a pattern according to which they are to be measured) ever came from thence. This I say he will easily make manifest; for it is impossible, that ever so weak a piece, as this is, and with so many Patent and open errors against Geometry (as we shall presently see) should ever come from any Geometrician, much less from Heaven. Which that it may appear, we will briefly run over the Propositions, as they are in the Book, to see which of them may deserve to be thought to have particularly descended from Heaven: and then note onely some more patent and obvious errors, such as you your self may easily conceive: by which you may guess at the rest, and what can be here expected.

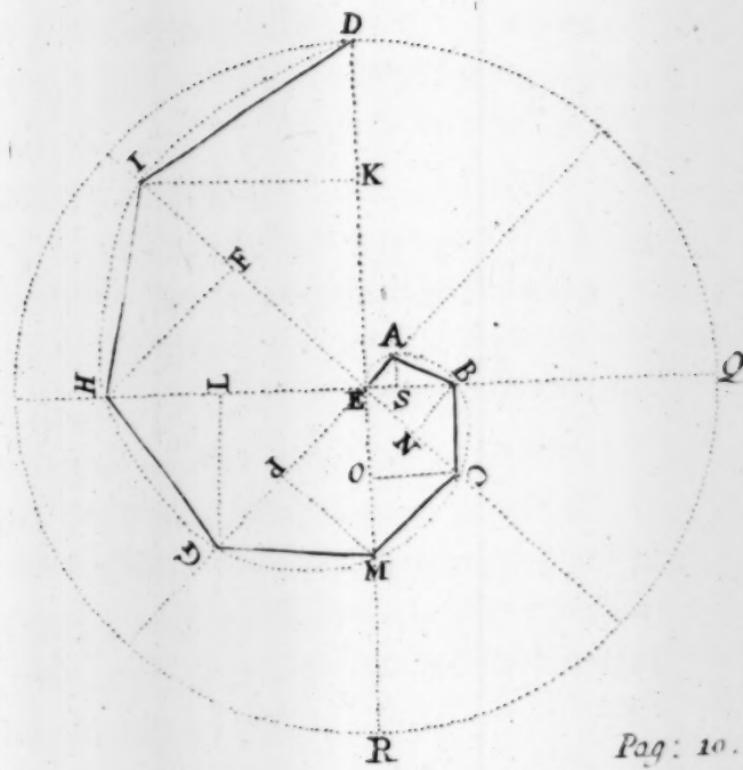
His Treatise then contains in all thirteen Propositions; of which the two first onely expli-

cate

cate the tearms he is to use. The two next are taken out of his Brother, Mr. Richard Whites Book called *Hemisphaerium dissectum*, as he also acknowledges; so that certain it is, that these first four came not from Heaven. The five following aim at the *Quadratura Circuli*, but perform no more then a hypothetical, or conditio-  
nate Quadrature: that is, if such or such a proportion were known, it were possible to square a circle; but of such Quadratures as these, we have enough already, and books are every where full of them. For the rest, I finde nothing in these propositions truly demonstrated, that may not be found in other Authors: so that in these nine first Propositions, we have nothing that may be thought a wonder fallen from Heaven, as was promised.

In the Annotation before the tenth

tenth Proposition he endeavours to demonstrate, that a Spiral line of the first revolution is precisely equal to half the circumference of the including circle. For example that the Spiral, noted here by the pricked line E A B C M G H I D, is equal to the half circumference, D Q R. This Demonstration indeed seems to have somewhat of the extraordinary in it: but yet it is neither new, nor true; and so impossible it should come from Heaven. For this self-same Demonstration was found out above thirty years ago by one *Gulden* a Jesuite: and is to be seen in his Book, called *Centrobaryca*, or, *De centro Gravitatis*; as Mr. *White* here also acknowledges. This Demonstration, I say, *Gulden* found out, and shews in the said Book, lib. 2. c. 2. prop. 6. But afterwards, before the Book was printed,



*Pag: 10.*



printed, being aware of the falsity found out by calculation, and perceiving it to be so, he presently recalled the same in the next Chapter, and clearly shews, that not onely the Spiral line it self is bigger then the said half circle, to which before he thought it was equal; but also evidently shews, that the sides of an inscribed Polygone of twelve Angles is also bigger then the said half circumference, as I shall afterwards declare.

Of this *Guldens* recalling Mr. *white* (as himself testifies) was by some friends informed; but not being able, as it seems, to examine *Guldens* calculation; nor to see the force of it, he presumed to print the said Demonstration, as his own, and to maintain it to be good, and evident, and *Guldens* calculation, or retraction, to be manifestly false, as we shall presently see.

This



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This

This Demonstration I say, Mr. *white* let pass to the print; yet conceiving, as it seems, that people would still think it to be taken out of *Gulden*, it being the very same with his, he thought good to joyn thereto another of his own, demonstrating the same assertion, in a different way from the former; which he performs in the tenth and eleventh Propositions. And certain it is, that this Demonstration is wholly his own, that is, that it neither came from Heaven, nor from any other Geometrician; it being impossible, that so many and patent errors should come from any that ever studyed Geometry, or read so much as *Euclide*; or even knew but how to resolve a plain Triangle.

For in the tenth Proposition he affirms and pretends to demonstrate, first, that if in a

Spiral

Spiral line of the first revolution, be inscribed a Polygone with equal angles, (as in the adjoyned Diagram, you see here inscribed the Polygone E A B C M G H I D, with eight equal angles) that then the sides of the said Polygone shall equally exceed each other: that is, as much as D I exceeds I H, so much precisely shall I H exceed H G, and H G exceed G M; and so of the rest.

Secondly, he affirms this common excess to be equal to the least side of all; viz. to the side E A. These two Assertions he puts in the Title of the said tenth Prop. which is this, *Latera Polygoni inscripti spirali per aequales angulos exuperant se se invicem per excessus minimo lateri aequales.*

Thirdly he likewise affirms, that having let down from the points I, H, G, M, &c. Perpendicu-

diculars to the opposite Semidi-  
ameters, (as here you see let down  
the Perpendiculars I K, H F,  
G L, &c.) that then the parts of  
the said Semidiameters, inter-  
cepted between the Perpendicu-  
lars and the Spiral, that is, the  
parts K D, I F, G L, and so of  
the rest, shall be equall. This  
third he inferres (though falsely,  
as presently we shall see) about  
the middle of the said tenth  
Prop. in these words, *Æquales  
staque sunt rectæ K D, I F, &  
H L.* all which three Assertions  
are evidently false, as I shall  
briefly shew.

For if we put the Semidiame-  
ter E D (which according to the  
construction of the Spiral, is here  
supposed to be divided into eight  
equal parts) to contain 800 equal  
parts; the next E I will contain  
700: and E H will have 600,  
and E G 500, and so forward:

So

So that the first E A will have 100, and E B 200, &c.

Whereby we have now in every Triangle E D I, E I H, E H G, &c. two sides known, together with the angle comprehended.

For example, in the Triangle E D I, we have the side E D 800, and E I 700, together with the comprehended angle D E I of 45 degrees. So likewise in the Triangle E I H, we have E I 700, E H 600, and the angle I E H 45 degrees as before; and so of all the rest. Which being known, we may presently by resolving the said Triangles, finde the two last sides of the inscribed Polygone, to wit D I, and I H, to contain the one 581, and the other 505, whose difference or excess is 76. But if in the same manner we resolve the first Triangle E A B, we shall finde the

T second

second side A B to be onely 147; from whence being taken the first side E A 100, shews the difference between the first and second side to be onely 47. And so in like manner will the difference between the second and third, A B and B C be onely 65. Now these three differences or excesses, 76, 47, and 65, are far from being equal, as Mr. *white* would have them. Wherefore in this he must needs confess himself quite mistaken, and his demonstration thereof to be false.

Neither is his error less notorious in affirming the said excess, (which he also falsely supposes to be common to all) to be equal to the least side, that is, to the side E A: for E A being 100, is bigger then any of them all, as we have seen. Yea, he is so inexcusable in this, that his very eyes might have discovered the error.

His

His third Assertion is also as false and unexcusable, to wit, that the lines K D, F I, L H, &c. are all equal. For resolving the Triangles E I K, E H F, and E G L (in which you have a side with all the Angels) you will finde E K 495. E F 424. and E L 353 which being respectively substracted from E D 800 E I 700. and E H 600, leave K D 305, F I 276, and L H 247. which three numbers are also far (as you see) from being equal, as Mr. *white* pretends to have demonstrated. Wherefore we must needs here conclude, that such Demonstrations as these never came from Heaven, as Mr. *white* perswades himself, and would have us believe. And truly whosoever reads this his tenth Prop. will clearly see his want of Principles, and that he was fallen upon a businesse he un-

B T der-

derstood not : wherein he was so puzzelled, that he quite forgot what he had said he would prove, to wit, that the said common excess was equal to the least side : for of this, after he had put it in the title, he makes no more mention, nor once goes about to prove it.

Now out of so weak and false a ground as this of the tenth Prop. he demonstrates in the eleventh (at least he thinks so) that the Spiral line E A B C M G H I D, is equal to the half circumference D Q R : but again performs it so unskilfully, that although the ground now laid in the tenth were true, yet follows not his intent. For by shewing onely that it is not bigger, he inferrs it to be equal ; which is no consequence, although the Antecedent were true : but both the one and the other

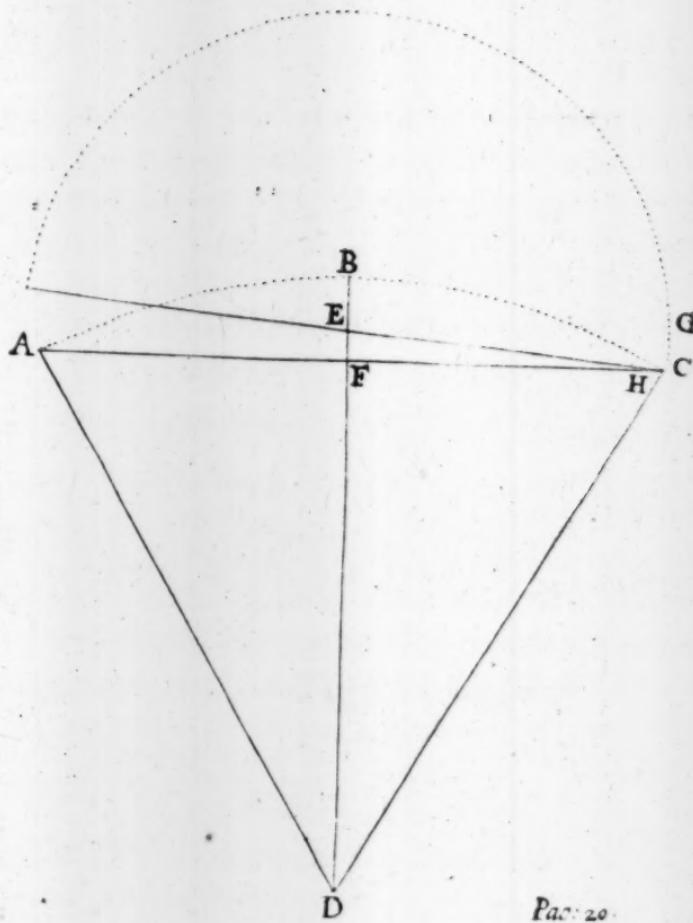
other are false, as we shall presently see.

Now after so weak and false a Demonstration, by which he thinks he hath concluded the said Spiral and half circumference to be equal, he proceeds in the twelfth Prop. to refute *Gulden*; who recalling (as was said) this very Demonstration, (which now Mr. *White* pretends to be his own, and maintains to be good) clearly shews, that not onely the Spiral it self is bigger then the said half circumference; but also an inscribed Polygone, for example of twelve equal angles, is considerably bigger.

To confute this assertion of *Gulden*, Mr. *White* puts his twelfth Prop. wherein he pretends to demonstrate against *Gulden*, that the sides of such a Polygone being added together are

less then the said half circumference : but truly with a Demonstration like the rest, that is most false and frivolous. For having put the line  $E\ C$  in the Diagram of the said twelfth Prop. (which Diagram I have here adjoyned) to be the greatest side of a Polygone inscribed with twelve equal angles, he supposes that the same longest side  $E\ C$  being taken six times, will be equall to all the sides of the said Polygone added together: for so he writes a little after the beginning of the aforesaid twelfth Prop. *Clarum est itaque, EC sexies repetitam, hoc est figuram inscriptam spirali, esse majorem, &c* Whereby you see that according to Mr. white it is all one, to take the longest side of such a Polygone six times, or to take the whole inscribed figure, that is

all



Page 20.



all the twelve sides added together: which notwithstanding is most false. For if we put the Semidiameter  $DB$ , or  $DC$  to be 12000, we shall have in the Triangle  $DEC$  two sides known, to wit  $DC$  12000, and  $DE$  11000, together with the angle  $EDC$  grad. 30. From whence is evidently concluded  $EC$  to have 6031. (I omit here always the Fraction as making not to our present purpose) which number taken six times makes onely 36186: whereas all the twelve sides, found out in the same manner and added together, make 40003, as appears in the Table here adjoyned. So that in this supposition Mr. *white* is quite out.

Yet notwithstanding this false supposition, he goes forward to demonstrate against *Gulden*, that

the sides of such a Polygone added together are less then the half circumference ; which he performs so confusedly, and unskillfully, that it is impossible to infer any thing to his purpose out of such a discourse. But be the discourse what it will , at last he strongly concludes against *Gulden*, that the sides of the said Polygone are less then the half circumference.

But this his conclusion is most false , as *Gulden* hath evidently shewn , lib. 2. c. 3. prop. 1. and may be so apprehended by any man that knows but how to resolve a plain Triangle. For by finding every of the twelve sides of the Polygone in such manner, as we now found the twelfth or longest side *E C* to be 6031. we shall have all their numbers, as appears in the here adjoyned

ed Table; all which added together, make, as you see, 40003. Whereas if according to Archimedes, you number the said half Circumference, by taking the said Semidiiameter E D 12000 thrice with its seventh part, we shall finde the said

12	6031
11	5520
10	5011
9	4505
8	4001
7	3501
6	3006
5	2522
4	2053
3	1614
2	1239
1	1000

Summa lat	40003
Semiperiph	37715
Differentia	2288

ly 37715: which is far less then 40003. And by consequence the fides of a twelve angled Polygon inscribed in a Spiral, are absolutely longer then half the circumference of the first circle, as *Gulden* truly and learnedly shews against Mr. *whites* so weak

a Demonstration for the contrary, as we have seen.

By these discoveries of so many undeniable errors in his Ageometrical Demonstration, one would judge that Mr. *White* had the least reason of all others to censure any one; yet such is his passion, that he falls bitterly upon *Gulden*, censures, vilifies, and reviles him insufferably, calling his Computation unskilfull, and that he hath not a jot of Mathematick or Geometry in him; terming him one of those half Schollars, who stealing divers excellent things out of other Learned mens Writings, endeavour to make them seem their own, This bitter invective hath Mr. *white* against *Gulden*, a man who never had in the least offended him, perhaps never heard of him, being dead many years since,

since, and so not able now to answer for himself. Take Mr. White's own words at the end of his twelfth Proposition. *Calculus itaque Guldenianus imperitus est, & qualem ab ipso acceptari (neque enim vel talem ipse instruxit) decebat: Homine prorsus Amathematico, ut legenti ipsius scripta primum est patere.* And a little after having taxed his want of humility and candor, he concludes him to be, *Hominem officij Geometricij prorsus ignarum; & ex eo semidoctorum genere, qui cum ex magnorum virorum scriptis egregia multa depeculati fuerint, ut sua faciant, additis quibusdam levibus, justi voluminis ostentatione se vulgo discentium ostentant, &c.* This gall, whilst Mr. White flourished amongst his admirers with his new Demonstration, might have affixed some seeming blemish upon *Gulden*, amongst such

Ageome-

Ageometricians as Mr. *White* is, but now appearing by what is said, to proceed from so unskilful a hand, it cannot tend to the disgrace of any, save the censurer, who condemns that which he understands not. For certainly no Geometrician would or durst have said so much; the Computation being performed according to the 47. 1. *Euclidis*, by the extraction of the square Root; then which there can be none more exact and manifest. As for that he calls him *Semidotus*, a half Schollar, one utterly void of all Mathematick; that he hath stolen out of other mens works; and all this imnediatly after so many errors committed by himself, he hath put the lash into the hands of such, who if they please, will quickly know to use it; especially being so justly provoked by seeing one of

their

their own Order so wrongfully abused ; and will not fail to re-tort upon him all that he impos-ses upon *Gulden*. And truly who-soever shall read this Geometri-cal Treatise (which Mr. *white* esteems the master-piece of all that ever he hath writ ) and *Gul-den*s Book called *Centrobaryca*, will finde so main a difference, that Mr. *white* without any pre-judice, by what appears in his, may be scarce thought fit to be *Gulden*s Schollar.

And whereas he calls *Gulden* one of those half Schollars, who steal out of other Books, they will easily make it appear, that, whatsoever it be of *Gulden*, cer-tain it is, that Mr. *White* hath stolen that Demonstration out of *Gulden*. For even by his own confession it came not from him-self ; *Now à me bac habes, &c.*, and to say it came from Heaven, were

were a blasphemy, it being manifestly false, as we have seen: Wherefore it must necessarily be concluded, that Mr. *white* took it out of *Gulden*, who printed it many years ago, as a particular invention of his own; neither can any other Authour be cited, who published it before him.

Truly a man would think Mr. *white* to have already said more than enough in so vilifying, and even trampling upon this Author, especially there appearing no cause for such bitterness. But he is not satisfied to have thus disgraced him, as much as lies in his power, with the note of ignorance in the Science he professes; but he falls upon his Moral Virtues, taxing him of Vanity, want of Humility, Candour, and the like, affirming him to be so vain, that although he thought he had committed an error, (to wit, in his Demon-

Demonstration of the Spiral) yet he could by no means be induced to cover it, by blotting it out, or candidly to confess the same, but goes on, framing excuses, as if in the very error he had carried himself gallantly. Master whites words are these in the place now cited: *Et (quod fædissimum est) tantæ vanitatis est, ut cum erravisse se putaverat, neque delendo tegere, neque candidè confiteri sustinuerit; sed excusationes texere, quasi in ipso errore egregiè se gesserit, ostentare perget, &c.*

¶ most unworthy and false calumny ! when I had read these in Mr. white, and compared them with what *Gulden* sayes in recalling the said Demonstration of the Spiral, I was amazed, how Mr. white did not even blush when he writ so foul and evident an untruth. For of all that, which he so maliciously here imputes unto

unto this man, there is not one word to be seen in *Gulden*, nor the least ground or shadow in his writings; yea, the just contrary to what is here so shamefully avouched, doth manifestly appear, as any man may see in his Book called *Centrobaryca*, cited by Mr. white. Where lib. 2. c. 3. re-tracting the said Demonstration, he plainly tells the occasion of it; viz. that being informed that a certain Mathematician had by Calculation discovered an error in his Demonstration, although at first it made no great impression in him, for he thought himself so secure, that he hoped sooner to finde a thousand errors in that Mathematicians Calculation, then one in his own Demonstration: *Mille posius sperabam me in Calculo hujus examinis, inventurum errores, quam vel unicum in meis inventis, sed contra*

*quasi*

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*quasi accedit, &c.* But I found, says he, just the contrary. For having examined the said Calculation, I clearly saw the error, and was forced to confess it, *Victus debui dare manus.* Whereupon he presently retracts it, and is so far from excusing the error, or refusing to confess it, or bragging as if he had carried himself gallantly therein, (as Mr. White most falsely and injuriously imposes upon him) that he plainly and candidly confesses it, saying, that he had rather follow the example of other worthy Authors, who in like case have, to their own praise and profit of others, revoked their errors, than of such as had rather accuse *Archimedes, Euclide*, yea, Geometry it self, then once acknowledge the errors of which they were convinced. *As to that whereof Mr. white* most

most wrongfully taxes him (in those words *neque delendo regre*) for printing the said Demonstration, although he thought it to be false, *Gulden* gives there also the reason, why he printed it: to wit, that others seeing how he had erred in a Demonstration, which at first sight seemed so currant, might beware of the like fallacy: *Ut sciens sibi cavere a scopulis.*

By all which is most evident, that it was ignorance, and passion, and neither knowledge, nor reason, which extorted these ugly censures from Mr. *white* against *Gulden*: and how far that Author was from that vanity and stubbornness in maintaining what he had once asserted, though he thought it to be false, as Mr. *white* would make the world believe. For I dare maintain, that there is not an Author

to be found, who in the like case hath carryed himself more modestly and candidly then this man hath done: as any, who shall read the said third \*chapter, will, to *Guldens* praise and Mr. *white* confusion, plainly discover. And God grant Mr. *white* may but with as much humility recall and acknowledge what he hath written amiss in matters of more concern, as this man does retract his Mathematical error.

\* As you  
may see  
at the end  
of this  
Letter.

Wherefore in this so much vilifying of *Gulden*, he hath again put the lash into his adversaries hands, who may use it at their pleasure, and make known unto the world, that no man that had any worth in him, conscience, or moral honesty, would ever so unworthily have carried himself as Mr. *white* hath in this. Yea, they may, if they please, report all that he so wrongfully

C      layes

layes upon *Gulden*, most justly upon Mr. *white*: making it appear, that he is rather to be taxed of vanity, as having gotten only some few Tearsms of Geometry, (and yet more then he knows well how to use) would fain have the glory of a Mathematician. For although with the one hand he seems to drive it away, yet with the other he draws it to him, as any man but reading his Preface will clearly see. For although he tell his Reader, that he is no Geometrician; and that these so great things (as he fancies them) come not from himself but from God; *Non à me  
hac habes*, &c. yet he would have him withall to take notice and well understand, that he is also able even by the force of his natural wit, to perform as great things as these are. For speaking of himself and what he is to deli-

ver in the said Geometrical Tract, he writes thus: *Author vel suâ industria perfecit que offert, vel privilegio magnæ Providentiae accepit. Si à se, & ingenij eâ virtute, qua plura ejusmodi confidere in parato habeat, certè est, ut non sint contemnenda illa cætera, que in publicum usum elaboravit, &c.* Whereby you see, he plainly tells his Reader, that he hath now already in store divers other things, as good as these. *Plura ejusmodi in parato habet.* And these also found out by the vigour and strength of his own wit. *Eâ ingenij virtute, qua, &c.* Yea although he tells his Reader, that he must onely thank God for these wonderfull things; and that in thanking the Author he shall do him injury, and lay a burden on his shoulders more then he is able to bear: *Mibi si grataris, injuriarum te postulo,*

*quod plus in me oneris aggeras,  
quam cui sim ferendo.* Notwithstanding he plainly shews by what you have heard, that he is ready and able to bear more thanks, then I believe his Reader will give him: especially when he shall perceive himself deluded in the Preface, with expectation of wonders from Heaven, and when all is done, finding nothing worth the reading.

But Mr. *white* is not content with so much depressing this Author, but passes further, branding him with the badge of an Heretick, or worse; intimating him to be one of that pernicious Sect of Pedants, who by their prating, labour and endeavour to destroy not onely all humane Sciences, but even Christian Faith it self, by taking all certainty from them. For giving a reason why it so much enveighs against

a man wholly unknown to him, he presently adds, Quantumvis  
opere pretium erat, lectorem moni-  
tum reddere de exitiali hac sciol-  
rum secta, quæ sub professione fa-  
cultatis garriendi, omnem certitu-  
dinem, tum è scientiis, tum ex fide  
Christianâ tollere molitur. Here  
 Mr. White stops; and truly it was  
 time: for having forgot what he  
 first intended, to wit, to draw  
 out a perfect picture of *Gulden*,  
 he hath mistaken the colours, and  
 goes on drawing forth his own,  
 as any man that ever knew them  
 both, will evidently discover.

Now if you ask me what was  
 the main cause, that moved Mr.  
 White to this height of passion,  
 he himself tells you, to wit, that  
 he was forced and compelled to  
 utter those censures. And why?  
 Because the shadow (as he sayes)  
 of *Guldens* great Tome did hinder  
 his Scholars from embrac-

cing the truth (he should have said the *falsity*) he proposed to them. For so he writes in the place before cited. *Hac coactu sum de homine cæteroqui ignoto prodere, quia umbra Tomi illuſtris, per opinionem consequam, officiebam veritati, quam ejusdem studiosis offerebam.* In which words I should rather think Mr. White to have wronged his Scholars, in making them such as should be frightened with a shadow. But it seems more probable, that his Scholars better understood the force of *Guldens* Computation, then their Master either would or could, and saw clearly that it did conclude. Howsoever it is most strange, that any wise man for so frivolous a toy as this, should so highly offend both Almighty God and his Neighbour, and so evidently expose his own reputation to the

unavoidable stain of a notorious  
Detractour.

Truly, as it seems to me, in this the particular hand of God shews it self, as well for his own good, (if he will make use of it) as for the good of others: in permitting Mr. *white* so to cross his own designs, that whereas he thought in this Tract to advance himself and his former writings, in the repute of every one, he should finde the quite contrary. For whereas he thought thereby to have got the name of a great Mathematician, he hath clearly shewed that he is none; and that he is indeed onely furnished with such general Terms and common Notions in the Mathematicks, as being with confidence and boldnesse pronounced in the company of such, as do no more thorowly understand them then himself, are apt to produce in

their mindes, an opinion, that the pronoucer is certainly a learned man, & understands exactly what they hear so strongly assevered by him: whereas if some learned Mathematician should perhaps over-hear him, he would smile to hear so much Geometrical Non-sense. Nay, whereas he assured himself to conciliate an immovable authority to all his former Dictates amongst his admirers, by this unparalleled Demonstration, even some of them (as I am certainly informed) have discovered the weakness of it, and both blush to see it, and labour to hide it. In like manner, whereas (by vertue of his said *Tutela*) he aimed to be accounted a person whom Almighty God particularly designed to use as his Instrument for the governing of his Chnreh in this present conjuncture; and to this effect, to have

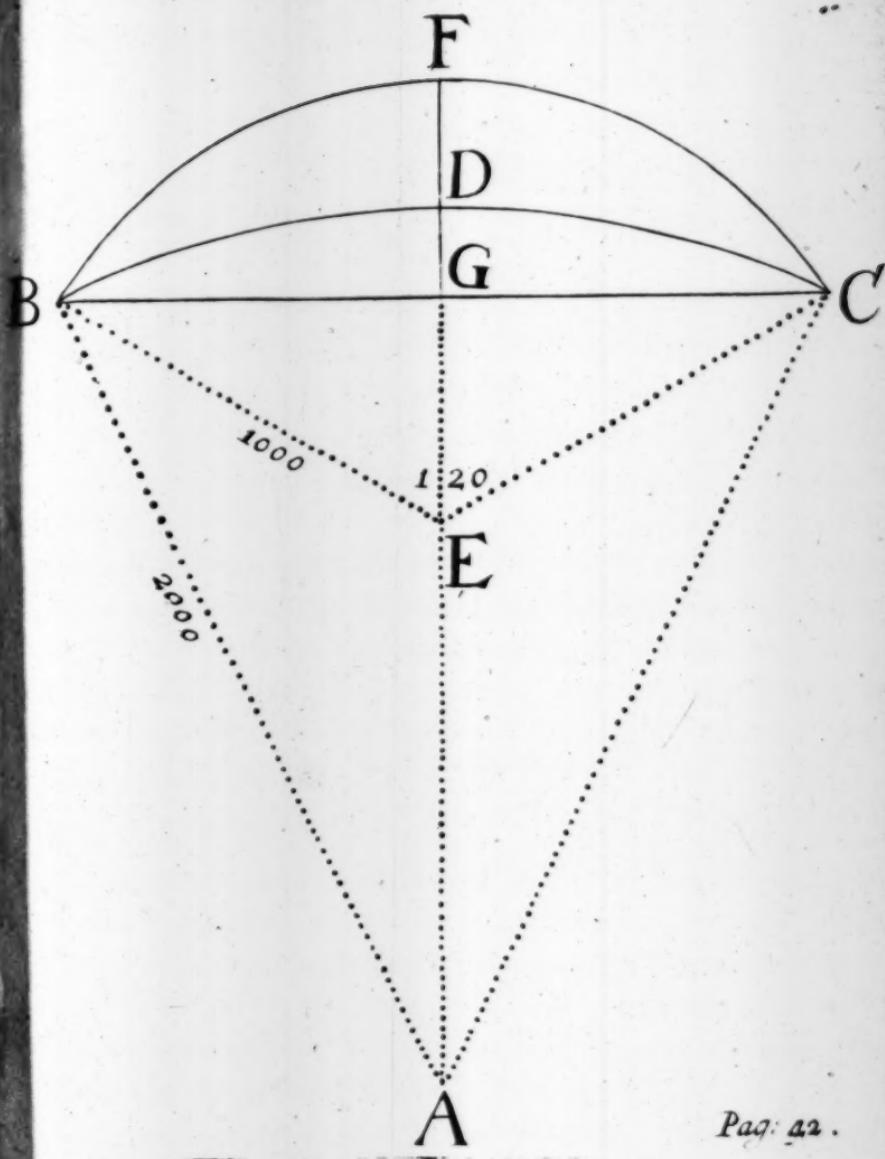
have received great light and Infused knowledge from him, as we have heard him speak in his Preface; he hath now given such a Character of himself, that it is impossible, that any man should be so simple as to think, that the wisdom of God would particularly make choice of such an Instrument for so high a Work; to which men of far greater Charity and Perfection of Virtue then he can with any reason or ground be supposed to have, are wont to be called.

This unworthy proceeding of Mr. *White* had made me almost forget to refute his *Quadratura Circuli*, pretended to be shewen in the first nine Propositions: which I deferred to the last, because he in his thirteenth and last Proposition hath put the last hand thereunto, and so confirmed as he thinks the ground thereof, that

he

he supposes it now as evident (to use his own phrase) as that a Boat is a Boat.

Wherefore in this thirteenth Prop. he again affirms, what he had before averred in the sixth; to wit, that the Segments, or Portions of unequal circles, having the same Chord, (so that they be less then a Semicircle) are proportional to their Axes. *Portiones circulorum inæqualium, semicirculo minores, quarum subtense sunt æquales, sunt in ratione suorum axis.* For example, in the adjoined Diagram, he affirms, that the greater Segment B F C B hath the same proportion to the lesser Segment B D C B, that the greater Axis F G hath to the lesser D G. This is the ground of his *Quadratura*, which we will now shew to be most false, and by consequence, the whole building to fall. Which that





that it may the more clearly appear, let us suppose  $E B$  or  $E F$  the Semidiameter of the greater Segment  $B F C B$ , to be 1000, and his angle at the Center,  $B E C$ , to be 120 degrees, or the third part of the whole circle  $B F C$ : which being supposed we have.

1.  $E G$  500, as being the Sine of the angle  $E B C$  30 degrees, and by consequence the greater Axis  $G F$  is also 500.

2. By the usual proportion of the Diameter to the circumference we shall finde the Sector  $E B F C$ , being the third part of the whole circle, to contain  $1047619\frac{1}{2}$ .

3. By the Perpendicular  $E G$  500, and the half base  $G B$  866, or Sine of 60 degree. We shall finde the Triangle  $E B C$  to contain 433000: which being subtracted from  $1047619\frac{1}{2}$  the whole

whole Sector, leaves 614619,  
for the greater Segment BFCB.

In like manner, if we put AB  
the Semidiameter of the lesser  
Segment BDCB to be 2000,  
that is, double to EB, we shall  
finde

1. By the 47. 1. *Eucl.* AG  
 $1802\frac{2}{9}$  proxime: which taken  
from A 2000, leaves  $197\frac{1}{3}$ , for  
the lesser Axis GD.

2. By what is known in the  
Triangle ABE we shall finde  
the angle BAE, whose double  
shews the whole angle of the  
Sector ABD C, to be 51 degr.  
 $19' 30''$  from whence by pro-  
portion thereof to 360 degr. is  
found the Sector ABD C to  
contain 1792126.

3. By the Perpendicular AG  
 $1802\frac{2}{9}$ , and the half base BG  
866, is found the Triangle  
ABC to contain  $1561205\frac{1}{9}$ ,  
which being taken from the  
whole

whole Sector 1792126, leaves  
 $230920\frac{4}{5}$  for the lesser Segment  
 B D C B.

So that now we have the said Segments and their Axes, all four in numbers, to wit, the greater Axis 500, the lesser  $197\frac{2}{9}$ , the greater Segment  $614619\frac{1}{21}$  and the lesser  $230920\frac{4}{5}$  which four numbers are by no means proportional, as they should be, if Mr. *whites* Demonstration were true. For by saying as 500 to  $197\frac{2}{9}$  so  $614619\frac{1}{21}$  to a fourth, there will not be found (as was expected)  $230920\frac{4}{5}$  but another number far bigger, to wit,  $242433\frac{1}{3}$  the difference being (as you see)  $11512\frac{8}{9}$ . Which great difference shews evidently the falsity of Mr. *whites* Assertion. Yea, if we put the greater Segment to want but very little of a Semicircle, for example onely one Minute, or one Second, &c.

the

the error will be yet more notorious, and the proof more easie. For then the greater Axis will be 1000 proximè, and the greater Segment will be 1571428: the lesser Axis will be 268: and the lesser Segment 363238. which four numbers are yet far more disproportional: for by saying as 100 to 268: so 1571428 to a fourth, we shall finde 411142, which is greater then 363238 by 47904, almost an eighth part of the lesser Segment. So Mr. whites Demonstration of the *Quadratura* comes to just nothing. But this is like the rest: for with him Demonstrations are nothing but stout and undaunted asseverations, proved by a company of Terms (that make a shew of learning to the unlearned) jumbled at a venture together.

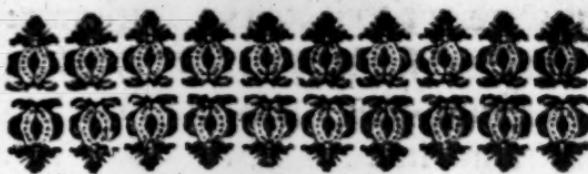
Some perhaps, to excuse this  
so

so gross an error of Mr. whites, will say, that by *Portiones Circulorum* he meant not the Segments, as we have said, but onely the Arches or Circular Lines B F C and B D C. But this explication will not suffice: for neither had this been to his purpose for the *Quadratura*: nor in it self is it true. For neither are these Arches proportional to the said Axes; the one B F C being  $2095\frac{1}{2}$ , and the other B D C being  $1792\frac{1}{2}$  which numbers have by no means the same proportion that 500 hath to  $197\frac{1}{2}$  as a blinde man may see. Wherefore Mr. white must be content to lay up this Error with the rest.

And thus much, Honoured Sir, concerning such things as Mr. White pretended here to demonstrate, but hath not performed. But if you ask me what he hath in this little Treatise truly and clearly

clearly demonstrated, I can only answer, that he hath demonstrated, first that he hath a great deal of vanity: secondly, that he hath very little or no Geometry: and thirdly, that he hath as little or less charity. For the rest, I have no more to say at present, but hoping you will rather reflect upon what is here said, than upon the rude and unpolisht Style by which it is exprest, I remain

*Your bumble Servant.*



## The Publisher.

TO THE

# READER.

**H**aving Printed the precedent Letter, and understanding before the publishing of it, that Mr. *Whites* *Tutela* so often mentioned, was supprest, no more Copyes to be had, whereby the Reader might receive satisfaction in conferring what is here said, with the Authors own words: I thought good to annex such places, *verbatim* out of Mr. *Whites* Book, as are touched in the said Letter. To which purpose I have also adjoyned *Guldens* *Retractation* of his *Spiral*, taken out of his Book, *de Centro Gravitatis*, the Book it self being dear, and scarce to be got. I have put both these, first in Latine, as

D they

they were written by the Authour: next in English, because the precedent Letter mentioning them, is also in English. And first I will set down Mr. Whites Preface to the Reader, there being first mention made of it in the precedent Letter. Which Preface is to be seen in the beginning of the said Book, to which he frames this Title,

# CHRYSPIS,

Seu

*Scriptorum suorum in Scientiis ob-  
scurioribus Apologia vice  
propalata*

TUTELA GEOMETRICA

Ad Lectorem Cordatum &  
Serium.

**A**ristotelis (dicam, an Natura?)  
pomeria extenderat Digbasus E-  
ques, coactis in pellucida stativa Natu-  
ra partibus, quas turbide miscuerat  
generationum necessitas. Solum, fun-  
datura Substructiones, occupaverat  
quanti ipsa moles, rari densique supra  
serpentium ludis tessellata. Proximo  
sese exposuit gradus fraterna elemento-

rum acies, primis (ut appellant) armata qualitatibus. Hac obnixis in alternam internacionem frontibus, consanguineo cruento quanti aream, ad inexhaustam mixtorum ubertatem per admirandos & inscrutabiles plexus ebulliendam irrigant & facundant. Ornabant mixta Phrygionata secundarum qualitatum Texture; accendebant Actionis & Passionis emicantia & humanum contuitum obtundentia lumina. Sed neque Electricorum assaltus & resultus, neque Magneticorum in Homogeneo corpore mutabiles quasi consulto leges; neque Sympatheticorum ex insidiis dolosa & tenebricosa è longinquo Sagittatio, origines & semitas suas à tam acri vestigatore celare valuerunt. Quin & ad superiora sedilia mixtorum capita plantæ ascenderunt, & gradum ad animalia promoverunt. Hic se objecerunt scrutinio sensus & sensuum metæ, venerandi quodammodo naturæ limites: & superati scrutatoris oculum in arcana Animæ, & invisum orbem trajecere. Substitit in hac altitudine Digbas, materiam & materiorum universitatem tanto à se intervallo in imum dissipatam, non sine horrore despectans; & nobilissi-

bilissimo operi, cui de Immortalitate  
Animæ nomen fecerat, columnas appo-  
suit. Tantus erat Scientia fulgor, ut  
lippitudini sæculi cæcitatem adjiceret, &  
surebant vanitatis, qua in multiloquo  
efflorescit, amatores veritatis imaginem  
non sustinentes, & potioribus hæc scien-  
tiis adversari jactiabant.

Propterea necessarius erat aliarum  
Disciplinarum consensus, & rudem ac-  
ceptaverat ingentis illius opificii Author.  
Inventus sum, qui etsi Eloquentia De-  
cessoris impar & compendio natus, au-  
derem desideratorum Epitomen aggredi,  
& contractis, que fusiis Digbeus, &  
pro rerum qualitate disputaverat; ad-  
jectisq; Metaphysicâ tum corporum tum  
incorporeorum delineatione, Institutiones  
Peripateticas conderem. Adjeci & Sa-  
cras, & opuscula (quamvis nihil meum  
opusculi molem excedat) nonnulla Phi-  
losophica, de Mundo Dialogum, &  
præfationem ante Latinam Editionem  
operis Digbeani. Theologicam quoque  
Buccinam de Fidei & Theologiæ Natu-  
rà; & ejusdem defensionem adversus  
errorem cuiusdam Regularis de Personâ  
li Infallibilitate Papæ. Præterea de  
Gratia cum libertate consensu, & me-  
di

dio Animarum statu singula Commen-  
 tariola. Non mirum, si hac durius  
 excepta sint, quam Digbeani labores.  
 Cum & infeliciori stylo sint exarata, &  
 iter cæcioribus obfessum scopulis & ma-  
 gis affectuum tempestatibus objectum  
 terant. Sed idcirco maximè, quod in  
 omnibus Physicam, Metaphysicam, &  
 ipsam Theologiam, in auditio conamine  
 ad severiores Disciplinas adjungere, &  
 Architectonicam contignationem perspe-  
 ctabilem in toto processu, & dictorum  
 consensum & consequentiarum fidem  
 (nihilominus citra rigoris Geometrici  
 ostentationem) in eas inducere tentave-  
 rint. Quare hunc desiderari suspicatus  
 duos Euclidas, Physicum majorem natu,  
 adolescentiorem Metaphysicum effudi,  
 non vanæ spei futuros vades. Verum  
 enim verò etiam hanc evidentiam obsti-  
 natà incredulitate opprimenti sum exper-  
 tus. Quid super mihi reliqueram? Me-  
 minoram à Novatoribus fidei posci mi-  
 racula. Sed adea quæ suà evidentià sta-  
 bilienda erant, flagitare argumenta ul-  
 trà vim naturæ posita propudiosum erat:  
 attamen si quæ in Scientiarum Thesau-  
 ris admiranda laterent miraculis suppa-  
 ria, non in merito ad difficiliorum fidem

adhiberi consentaneum erat. Conjecti  
 itaque oculos in Geometriam, cuius si  
 qua dogmata hujusmodi veneratione  
 consecrata laterent, ea neque alienis ad  
 famam praesidiis indigerent, & suo mu-  
 nitis sigillo fidem conciliarent. Et ad-  
 verti reservata quadam ab ipsa usque  
 Disciplina infantia arcana, que maxi-  
 morum ingeniorum labores passa in im-  
 possibiliam transiverant classem. Pap-  
 pus & plerique posteriores Geometrae  
 tres Problematum ordines declarave-  
 runt; quorum infinitus regula & circino  
 perficiebatur; medius corporum sectili-  
 um vi; supremum non nisi fictitiis lineis  
 subiciebant. Et in posterioribus hac  
 arcana recondiderant. Vieta etiam  
 adjectis argumentis quedam apiceava  
 demonstravisse visus est. Cartesius de-  
 speratam rem agnovit. Plerique pro-  
 posito Problematis satisfecisse sibi visi  
 sunt, si ad hoc redigissent, ut eo soluto  
 monstrarent aliquod clausorum istius-  
 modi esse reseratum. Te testem invoco,  
 Maxime Archimedes, in secundâ se-  
 cundi de Sphaera & Cylindro, nisi men-  
 dax imponat memoria. Hinc itaque  
 captandam scriptis meis umbram censui.  
 Tu modo apud temet in consilium se-  
 vocatum

vocatum hoc pensi habeto. Author vel suâ industria perfecit qua offert, vel privilegio magna Providentiae accepit. Si à se & ingenieâ virtute, quâ plura ejusmodi confidere in parato habeat, certe is est, ut non snt contemnenda illa cetera, quae in publicum usum elaboravit; imo hoc nomine trutinâ acri digna, quia de tali orta sunt patre. Sin ab exorti περονίας vigilantiâ profectum hoc munus suspicaris, expende quanto fortius te ad reliquorum examinationem allegatum comperias. Me aspicis? Intuere me hominem, quem nemo Geometram salutet, modo ipse sit. Neque enim Geometrices plenitudinem vel appetivi. Prelectorem non audivi; studium non sum professus; magnorum Authorum nullum perlegi, non saltens Euclidem. Aliarum Disciplinarum ambitio me semper traxit & defixit: Geometricorum hunc fructum & speravi & tuli, ut eorum rigorem ad Metaphysica traducerem. Ceteroqui oblectamento mihi erant, cum deforet potiorum commoditas. Talis cum sim, non à me hac habes, sed ab eo, qui ex legibus providentiae suae ea Gubernationi Ecclesiæ sua in hoc rerum articulo opportuna &

fecit & vidit: Illi accepta refer. Mirbi si grataris, injuriarum te postulo, quod plus in me oneris aggeras, quam cui sim ferendo: & in Deum, à quo avertis quale quale à te debetur benignitatis premium. Quod supereft, tibi consule, & ostentum a cœlo ad te delapsum ue contemnito.

In English thus.

A  
GOLDEN SHIELD:

O R,

*A Geometricall Defence*

As an A P O L O G Y for all his  
other Writings in the ob-  
scurer Sciences.

By

Mr. Thomas White.

As

As for the Preface, the first part there-of concerns not our present purpose, as speaking onely of the profound re-search made into nature by that worthy Gentleman, Sir *Kenelme Digby*, (whose learning and respects to Mr. *White* would never certainly have suf-fered this Geometrical Treatise to pass abroad, had he seen it before it was published) I shall onely English these-cond, which Mr. *White* falls upon by occasion of an objection that some things touched in Sir *Kenelmes* Philo-phy seemed not fully agreeable to Sciences of higher consequence. The refutation of which objection Mr. *White* undertook, and so gives a brief account of such writings as he had pub-lished to that effect: and comes at last to this present *Tutela* which he is about to publish, intending it as a defence of all he hath hitherto writ-ten, and whereof he speaks to his Rea-der in these words, *Tu modo apud te-  
met, &c.* as we saw just now.

*In English thus.*

**T**AKE gentle Reader this into thy serious consideration, either the Authour

Author (meaning himself) hath performed the things he here presents thee with, by his own Industry, or by Gods peculiar Providence. If they be the fruits of his own industry, and proceed from that vigour of wit, by which he is also ready to perform many the like: certainly he is a person whose other writings formerly published for the common good, ought not to be contemned. Yea, for this very reason, they deserve a profound consideration, as proceeding from such a Father.

But in case thou consider them as coming from the Almighty, then think with thy self; how much greater thy obligation is to examine the rest of his Works. Lookest thou upon me? Behold the man, whom no man will call a Geometrician if he be one himself. Neither did I ever desire to compleat my self in that faculty; I was never taught it, nor did I ever profess to study it. I never read over any chief Author in that Science, no not so much as *Euclide*; but was always delighted with other studies. From Geometry I both expected and attained

ed sufficient for transferring its vigorous proceedings to the Metaphysick. Otherwise it was onely my recreation when I wanted better employment. Since therefore I am such, thou hast not these things from me, but from him, who in his Divine providence, both saw and fitted them for the Government of his Church in this present conjuncture. Give him the thanks; for if thou apply them to me, I shall expostulate the injury done me in laying a greater weight upon me then I am able to bear; and thou wilt lose the reward thou shouldest receive from God. It remains that thou neglect not thy own good, nor condemn a wonder come down to thee from Heaven.

Thus Mr. White in his Preface. By all which, and by the Title of his Book, he plainly shews, that according to the clearness and solidity of the following Demonstrations in Geometry, men must take the just measure of the solidity and strength of his other Demonstrations in Philosophy and Divinity. And thus much for those places of the Preface mentioned in the precedent Letter.

ter. I will now set down those that concern the dispute between Mr. *White* and *Gulden*, which are onely two; the former is in *Nota secunda* before the tenth Proposition: the latter in *Nota Quarta* at the end of the twelfth.

Ex Tutela Geometrica ante  
Prop. 10.

Nota Secunda.

*Finieram, & regulam cum circino consecraturiebam; cum ab amicis monitus sum, quam in Exercitatione Geometrica exhibueram spiralis ad Peripheriam Circuli aequationem, à magni nomine Mathematico, & prius excogitatam, & eadem demonstratione confirmatam, & posterioribus consiliis repudiatam fuisse, & oppositâ demonstratione reprobataam. Conscius eram, non indiligenter apodixi mea invigilavisse. Terruit tamen hominem (cui omonia alia præ Mathesi probabita fuerant) tot notis veritatis impressus rumor. Tolle de Tabula manum, & cum typis manda- visem, que sunt premissa, cetera usque ad examinationem hujus improperii sustinenda decrevi.*

*Author*

Author oppositionis erat quidam Paulus Guldenus, ex Societate Iesu, editor justi voluminis, quod pro Geometrico suppositum Centrobarica appellavit. Quid agerem? ubi degebam, opus illud non apparebat, & negotium quod illic gerebam, ad umbilicum perductum erat, & jam egelidum ver monebat astivam sedem Ciconiarum monitu. vestigare. Conculi me itaque Lugdunum Batavorum, & gratia clariss. Mathematicum ibidem Professoris Examinationem Problematis mei aggredior. Primo ipsam revisi; apparuit constantissima: summam tibi sic accenseo, &.

*In English thus.*

I Had even now ended, and began to lay my Rule and Compafs aside, when I was admonished by my friends, that the equation of a Spiral to the circumference of a Circle, which I had demonstrated in my *Exercitatione Geometrica*, had been found out before and confirmed with the same Demonstration, by a famous Mathematician: who afterwards retracted it, and by a contrary Demonstration, shewed it to be

be false. I was conscious to my self that I had not slightly examined my Demonstration : nevertheless a rumor with so many marks of truth somewhat frightened me, being a man that esteemed all other learning before the Mathematical. I presently made a stop, and having printed the precedent part *de Quadratura*, I deferred the rest, till I had examined this reproach.

The retracting Author was one *Paul Gulden* of the Society of Jesus, who had printed a compleat Volume, which he pretending to be a Geometrical Work, called it *Centrobaryca*, What should I do? Where I then lived. this Book was not to be had, and my work in hand was even now finished. Besides the Spring drawing on, did invite me by the crying of the Storks, to seek my Summer habitation. I went therefore to *Leyden* in *Holland*, and with the favour of the most famous Professor of Mathematicks there, I begin to examine my Probleme; I revised it, and found it most solid, Take here the summe thereof, &c.

This is Mr. Whites relation of the beginning of the Dispute between him

him and *Gulden*, handsomely, as you see, contrived, that he may not seem to have stollen the said Demonstration out of *Gulden*, but to have fallen upon it himself, or had it from Heaven. Yet all this will not serve his turn, but still the Reader will imagine those words in his Preface, where (speaking of this Demonstration together with the rest) he sayes, *Non hec à me habes, sed ab eo qui ex legibus Providentiae sue, &c.* are to be changed thus, (applying them to this particular) *Non hec à me habes, sed à Paulo Guldeno, qui ante triginta ferè annos ea primò invenit, & postea retractavit, &c.* After this relation Mr. *White* proceeds to confirme the said Demonstration and infringe the Retraction of *Gulden*, shewing his computation to be false, as he imagines: which done, he makes his *Nota Quarta*, or invective against *Gulden* in these words.

#### Nota Quarta.

*Calculus itaque Guldenianus impunitas est, & qualem ab ipso acceptari (neque enim vel talcm ipse instruxit) decebat,*

decebat, homine prorsus Amathematico, ut legenti ipsius scripta primum est patere. Nam dum proportionem Spiralis ad circulum ad struere conantur, assumptis sine probatione propositionem prorsus improbabilem, nempe, lineas intra aliam ductas esse minores illâ. Et si enim videatur de Inscriptis velle loqui, tamen quas ipse scribit nihil minus sunt quam Inscripta, cum circumscriptam non accedant nisi altero duntaxat termino. Rursus aequali temeritate vult Arcus circuli esse proportionaliter medios inter arcus Spiralis equalium angularium. Sed (quod faedissimum est) tanta vanitatis est, ut cum erravisse sese putaverat, neque delendo tegere, neque candidè confiteri sustinuerit, sed excusationes texere quasi in ipso errore egregiè se gesserit, ostentare perget. Quæ (utpote de sumpta ex locis Logicis vel Rhetoricis) clare docent hominem officij Geometrici (quod hac respuit) esse prorsus ignoramus, & ex eo Semidectorum genere, qui cum ex magnorum virorum scriptis egregia multa depeculati fuerint, ut sua faciant, additis quibusdam levibus, justi voluminis ostentatione se vulgo dis-

discentium ostentant: & (quod pernici-  
ciosissimum est) mixtis incertis, sacrum  
Scientia nomen denigrant, ut abunde  
egit noster Guldene; Saltationem  
telluris circa centrum, & consonantiam  
Centri in punto imaginario, in Geo-  
metricum tractatum inferiens. Hinc  
coactus sum de homine cateroqui ignoto  
prodere, quia umbra Tomi illustris, per  
opinionem consequam officiebat veritati,  
quam ejusdem studioes offerebam.  
Quantumvis opera pretium erat testa-  
rem monitum reddere de existenti hanc  
Sciolorum Sectâ, quae sub professione  
facultatis garriendi omnem certitudi-  
nem, tum è Scientiis, sum ex Fide Chris-  
tiana tollere molitus.

In English thus.

**V**Herefore Guldens calculation  
is unskilful, and such as was  
fit to be received by him (for he made  
it not himself \*) a man no way vers'd \* But he  
in Mathematick, as his Reader will  
easily perceive. For endeavouring  
to give the proportion of a Spiral to  
a Circle, he assumes without proof a  
proposition wholly improbable, viz.

E

that

there made  
another  
more ac-  
curate.

that lines drawn within another line, are less then it. For though he seem to intend to speak of lines inscribed; yet those he describes are nothing less then such, since they touch the circumscribed but with one end onely. In like manner with equal temerity he will have the Arches of a Circle to be mean proportionals between the Ar-

Both these ~~ches~~ of a Spiral of equal \* Angles. are retra-  
cted by *Gulden*,  
prop. 4.

But that which above all is the most detestable, his vanity is so great, that when he thought he had erred, he could neither endure to suppress it, nor candidly to acknowledge it, but proceeds framing excuses, and brags, as if therein he had carried himself very gallantly. All which, being but flourishes of Rhetorick, clearly shew him to be a man wholly ignorant of what belongs to Geometry; which uses no such Arts: and that he is one of those petty Schollars, who having stollen divers excellent things out of other mens Writings, that they may make them seem their own, adde some few trivial matters, and then boast themselves amongst their Schollars as the Authours of a great Volume: and

(which

(which is most pernicious) by mingling many uncertainties, defile the Sacred Name of Science; as this *Gulden* hath done to the full, thrusting into a Geometricall Treatise the Dancing of the Earth about its Center, and the Consistency of the same Center in an Imaginary Point. These things I was forced to publish of a man otherwise unknown to me, because the shadow of so fair a Tome, through the opinion it had gain'd, hindered the light of that truth, which I propos'd to those that sought it. Nevertheless it was worth the labour, to admonish the Reader of this pernicious Sect of Sciolists, who under profession of the Faculty of Prating, endeavour to remove all certainty, as well from Sciences, as from Christian Faith.

Hitherto we have heard, or rather seen Mr. *Whites* gall against this Author, through whose sides he unworthily seems to endeavour the wounding of his whole Order, under the title of *Exitialis Sciolorum Secta*. Truly a man would wonder to see, how stu-

diously and compleatly Mr. *White* here acts the part of a malitious Detractor, seeking every way to defame his Adversary: for besides what we have already heard in the precedent Letter, he intimates him here to be so little versed in the Mathematicks, as not to be able to make even the computation of a Polygone of twelve sides: for speaking (as we have heard) of such a Calculation which he tearms unkilful, and calls it *Guldens*, (though he tells us withal, that *Gulden* made it not himself, but received it from another) he malitiously inserts in a Parenthesis, *Neque enim vel talem ipse instruxit*, thereby to insinuate, that *Gulden* was unable to frame so trivial a Computation, as he (Mr. *White*) esteemed this. Wherein yet he could not be ignorant of the great injury he did this Author; who having set down the said Calculation of twelve sides, acknowledging it to be none of his own, but sent him from another, he examines and approves it in *prop. I. c. 3. lib. 2.* Which done, he presently in *prop. 3.* exhibits another of his own far more accurate, as consisting of a thousand sides, and per-

performed by a different way of computation, with laborious Tables expressing the quantity of each particular side: thence also probably inferring that the proportion of the said Spiral to the half Circumference is as 1961 to 1818 *proxime*. Yet Mr. *White* would take no notice of this Computation, although it were so near the place from whence he took that other of twelve sides.

But having attained his end in this he proceeds, finding a means to asperse him with a censure of absolute ignorance in the Mathematicks: where that the Reader may see Mr. *White's* malicious way of proceeding, he must know that *Gulden* (as we shall presently hear in his own words) having (before the printing or publishing the often mentioned Demonstration of the Spiral) discovered by help of a Friend an error therein, thought good notwithstanding to print it, not as a true one, but as erroneous. This he performs in *c. 2. lib. 2.* and presently *c. 3.* shews and refutes all the particular errors committed in *c. 2.* to the end that others advertised of the errors

committed in cap. 2. might beware of committing the like; *Ut sciant (faith he) sibi cavere à scopulis.*

Now here Mr. White playes his game, and taking no notice at all of this, playes upon *Gulden*, as if he had affirmed the contents of cap. 2. to be really true; which, as I said, *Gulden* did publish as absolutely false: then which a more unworthy proceeding can hardly be imagined, as will now appear.

For in the above named *Nota Quartæ*, Mr. White terms him, *Hominem prorsus Amathematicum*, a man utterly ignorant of the Mathematicks, in assuming (as he sayes) without proof a Proposition wholly improbable, viz. that *Lines drawn within another are less then it.*

But in this Mr. White extreamly wrongs the Authour, who onely sets down cap. 2. Prop. 3. the said Proposition as erroneous, which he took at first sight to be true; and afterwards cap. 3. Prop. 1. at large declares the error. Which had he not done, I dare boldly affirm, that all Mr. Whites Geometry would never have been able to discover

ver. But by this proceeding Mr. *White* thinks to attain what he aimed at ; viz. the depressing of *Gulden*, and the exalting of himself. For by concealing *Gulden's* refutation of the said Proposition, on the one side he would give the world to understand, that *Gulden* was not able to see and rectifie the error : on the other he would gain to himself the opinion of a sharp wit, and deep insight into the Principles of Geometry, in being able to detect what so great a Mathematician (as he reports in his *Nota secunda* that *Gulden* was esteemed) could not perceive : whereas indeed if *Gulden* had not put it into Mr. *White's* head, it had never been there. But to seek the glory of a great Wit and profound Mathematician, as also to purchase an esteem to all his other Writings by such Arts as these, is a thing most unworthy of a Gentleman. And though such Artifices may for a time, by some more affected to him then learned to discover them, be received with applause ; yet at last they will be discovered, as here they are, and instead of the hoped glory, bring nothing but

shame to such as use them.

Lastly, he accuses *Gulden* of rashness for affirming (as he sayes) the circular Arches to be mean proportionalls between the Spiral Arches of equal Angles. Wherein he uses the like artifice as before, by making *Gulden* assert even what he absolutely denies. For this Assertion corresponds onely to what *Gulden* sayes in the said cap. 2. Prop. 8. where he delivers it as false, and after proves the falsity, cap. 3. prop. 4, n. 6.

Thus much for Mr. *VWhites* invective against *Gulden*; let us now, if you please, hear *Gulden* speak himself, and see whether there appear in his words that great vanity, stubbornness, want of candour, and such ostentation as Mr. *VWhite* reproaches him with: and thereupon frame a judgement of them both, accordingly. *Gulden* therefore in the Preface to the cap. 3. gives a full account of his retracting the Demonstration of the Spirall: which is as followeth.

# De Centro Gravitatis,

Lib. 2. Cap. 3. Pag. 58.

Examen eorum quæ proxime  
præcedenti capite tradita sunt.

**H**ucusque ergo, amice Lector, nova  
hæc, & non minùs jucunda quām  
pulchra, de lineis Spiralibus speculatio  
non tam traxi, quām tam equis quām  
velis suavissimè nos provexit, nullum  
sive in aequore sive in montibus nobis ri-  
mientes vel periculum aperitum, vel insi-  
dias latentes. Nam regiā nos incedere  
viā scivimus potius, quām arbitrati su-  
mus; & solū intenti suimus quā rati-  
one, Scopum videlicet nostrum intuendo,  
nobis paulatim semitam ad indagandum  
Linea Spiralis Gravitatis Centrum com-  
modè præpararemus. Occurrerat sapienti  
quidem, dum hæc tractaremus, non levia  
cogitatio; quæ tamen ob certas rationes  
nos in capto retardare minimè visa est:  
nimirum si hæc Spiralis Linea dimen-  
tam obvia, tam commoda, tamque ordi-  
nata est, ut nos eam invenimus; tam fa-  
cile etiam progreditur, tamque firmis  
potest

potest roborari Demonstrationibus; cur  
eam non Magnus Archimedes, qui ea,  
que alii de Linea Spirali proposuerant,  
ipse admirabili (ut cum Pappo loqua-  
musr) quādam aggressione demonstra-  
vit; cur eam (inquam) Dimensionem  
libro suo De Spiralibus non inseruit?  
Sed facile nobis ipsis responsum dedi-  
mus: ipsum videlicet Archimedem plu-  
ra alia, quæ tamen alii post ipsum tracta-  
runt, vel neglexisse, vel studio ac volens  
præteriisse; vel etiam jam ab ipso tra-  
ctata, injuriā temporum, intercidisse.  
Quemadmodum etiam fecit, cum de Pla-  
norū centro ageret gravitatis: omisit  
enim Tractatum de centro Linearum.  
Et sicut nos non absterruit illa objectio ab  
indagatione Centri Gravitatis Linea-  
rum, præsertim Circularium; sic & hic  
nobis ipsis fecimus animos novi aliquid  
circa Spirales inveniendi, quod vel ipsum  
Archimedem fugere, aut posteros nos la-  
tere potuerit.

Et nostro quidem judicio rem tunc fe-  
licitè & incepimus, & in eādem ma-  
gnis etiam itineribus perrexi mus. Sed  
ecce dum hoc loco in medio quasi essemus  
cursu, portumque etsi valde procul ad-  
huc posatum, jam à longè tamen jam jam

con-

conficeremus, vela repente & erant contrahenda, & securitatis causâ ad legendâ littora prora convertenda. Incidis enim tunc primùm in Examen quoddam, per numeros institutum, dimensionis Lineæ Spiralis; de quo antè quidem inaudiveram, sed qualiter aut quâ ratione dimensio illa progrederetur, cum rectâne, an cum curvâ, aut purè circulari, Spiralis illa linea conserretur, omnino nesci-ebam: tantum abest, ut ipsam justam proportionem, à nobis inventam, inde redargui posse suspicarer. Quare ex pri-mo illius aspectu nequaquam sum ter-ritus; quippe qui meis fidebam Demon-strationibus, tam Geometricis quam Arithmeticis, quas irreprehensibles esse judicavi. Hostem tamen qualēm qua-lem sape audiri spernendum esse minime: quippe qui, quando minime putamus, vel obesse vel nocere possit.

Examinavi igitur examen illud; quo in labore mille potius sperabam me in-venturum in calculo hujus examinis er-rores, quam vel unicum in meis in-ventis. Sed contra quasi accidit. Re-peri enim Lineam Spiralem primæ Cir-culationis majorem esse Semiperipheriâ primi Circuli; & tacitè vietusque ma-nus

nus dare debui. Quid facerem? Dissimularemne? Tacerem? Mordicus mea,  
 instar Circuli Quadratorum suprà no-  
 minatorum, defendarem? Et Archime-  
 dem ipsum Euclidemque in jus vocarem,  
 accusarem, condemnarem? Nequaquam.  
 Sed servandum mihi duxi id, quod ipse  
 Jos. Scaliger sibi met quidem servandum  
 prescripsit; at minime servavit. Sic enim  
 in Appendix ad sua Cyclometrica habet.  
 " Primum aio, in omnibus Scientiis &  
 " Artibus posse sape tolerabiliter pecca-  
 " ri: in Mathematicis ne semel quidem  
 " debere. Nam ut ait quidam veterus  
 " Scriptor, Πάντα τέχνη μεθοδευόμενα  
 " εδιαμάρτυτον ἔχειν ἴφειλει τὴν ἀπό-  
 " φασιν. Itaq; cum Mathematicus erro-  
 " rem suum deprehenderit, primus occu-  
 " pare debet Me, Me, adsum, qui feci.  
 " Postquam autem per alium id cognos-  
 " verit, si non statim Castigatori gra-  
 " tias agit, male de homine; si non corri-  
 " git, male de Mathematica meritus est.  
 Verum bonus ille Scaliger præcipuos erro-  
 res suos, atro & rubro colore jam edi-  
 tos, non solum non correxit; sed &  
 majori inscitia animique tumore pertina-  
 citer defendit. Conclusi ergo, in meis  
 inventis alicubi peccatum esse. At ubi  
 lateret

lateret anguis in herbâ, non ita facile neque statim videre aut judicare potui. Quare Scripta mea amico in Mathematicis benè docto dedi perlegenda, ut an ea sibi constarent animum diligentè adverteret, suumque mibi de iis judicium candidè aperiret, eundem rogavi.

Verum enim verò dum ille differret lectitandi operam, ipse errorem meum reperi, & digito (quod aiunt) demonstrare potui. In eo solùm hæsi, an totum illud Caput præcedens: cum principi meo intento ac fini nihil tolleret; parum, etiamst omnia vera essent, adferret, omittendum esset, totumque negotium mensurationis Lineæ Spiralis dissimulandum: an vero, prout jam scripta essent omnia, una cum hoc Examine edenda. Occurrebant rationes plures & varia, prò & contrà: Vicerunt tamen illæ, qua in bonum aliorum laborem horum, partem saltem aliquam, ipsis communicandum esse, ceteris prælatæ sunt, suasèrunt & persuaserunt. Prasertim cum non defint exempla Autorum, qui & cum laude suâ & cum utilitate Lectorum idem factitârunt: qui si nullum alium hinc auferrent frumentum, is saltem satis esse posset, quod inveniant cautionem, ut si curiosi se

de Spiratibus, sive de alijs inquirere vellint, sibi sciant cavere & à scopulis, & ab alijs incommodis, in quæ facillime incurrere possent. Geometria profectò ipsa, secundum judicium Josephi Scaligeri suprà cap. primo Propos. 4. num. 7. adductum, sibi in primis gratulabitur, quòd accessione saltē novorum aliquot Epichirematum locupletata sit.

Primum igitur ināicandum est, qualiter in cognitionem venimus inventa nostra lubrica esse fidei; deinde, ubinam haret error, ostendendum: cum singula propositiones examinande, & pro meritis approbanda vel reprobanda, & siquidem id fieri commode poterit, erronea corrigeāde. Omisimus autem plurima jam conscripta, bonoque ordine ac methodo digesta; quæ si rationibus suis solide nixa fuissent. Lectori plurimum oblectationi esse potuissent: cum verò vacillantia ea inventa fuerint, ne fastidio posius essent, jure merito ea praterivimus. Non esset autem abs re cogitationem suspicere, qualisnam aut quæ sit illa flexuosa linea, & quæ arte illa compendiose describi possit, quæ illas haberet proprietates, quæ frustæ Spirali attribuimus. Id quod in aliud tempus, vel posius aliis faciendum reservamus.

Pro-

# Propositio prima.

Occasionem Examinis hujus ac  
Dubitacionis pressius  
declarare.

**F**uisse quendam, qui Dimensionem  
Linea Spiralis ante nos instituerit,  
memini me aliquando audivisse ex P.  
Hieronymo Kinig Societatis nostra  
Mathematico, & olim in Ingolsta-  
diana, Dilingana, ac Pragensi Aca-  
demiis earundem Mathematicarum  
Disciplinarum Professore accuratissimo,  
mibi & Rome & alibi notissimo; imo  
eundem Lineam illam alicui alteri  
aequali, sine tamen ulla Demonstra-  
tione, pronunciaisse; quod assertum di-  
ctus ille Professor examinaverit: cui  
vero Linea illam adquaverit, non so-  
lum tunc scire, verum an aliquando id  
sciverim planè meminisse non posui.  
Cum ergo versarer in scriptione supe-  
rioris Capitis, venit in mentem Examen  
illud quod diximus, recordatione tamen  
satis confusa. Existens ergo Gracii  
in Stiria scribo Viennam, ubi Mathe-  
maticus

maticus ille manebat; & si quid haberet his de rebus in Scripto, ad me miseret rogavi: non quod incertus esset de meis jams inventis & scriptis, autullo modo de iisdem dubitarem, sed ut illud ipsum cum meis conferrem. Annuit ipse, & sequens ad me misit, sive Examen, sive contra Afferta instantiand & reprobationem: quam cum examinasset, ut supra diximus, eam veritati consonam esse, manifeste comprehendi. Sic autem se habebant illa.

2. *Propositum sit demonstrare, Linéam Spiralem majorem esse Semi-circumferentiā; Intellige Círculi primiciam comprehendentis.*

The same in English.

OF

*The Center of Gravity.*

Lib. 2. Cap. 3. Pag. 58.

Hus far (Courteous Reader) had this new, and no les specious then delightful speculation on the subject of Spiral Lines rather swiftly advanced me, by Sea and Land as I may say, then slowly drawn me, who apprehended nothing either of apparent danger, or unexpected surprize. For indeed I rather knew, then imagined, that I travelled in the High Road; and looking stedfastly on my main design, I was wholly attentive to the means whereby to tread out a commodious Path for the Discovery of the *Center of Gravity* in the *Spiral*. True it is, while I was plodding thereon, a serious reflection came often into my minde, which yet, for certain reasons, was not sufficient to retard my course, *viz.* That if this Dimension of the Spiral Line were so obvious, easie, and commodious a thing, as I found it

to be ; as also strengthned with such firm Demonstrations , how came it to pass that the great *Archimedes* , who (to speak with *Pappus*) did with admirable Dexterity demonstrate those Proprieties of the Spiral Line , which other men had onely hinted at ; how came it , I say , to pass that he did not insert this Dimension into his Book of *Spirals* ? But I easily answered my self ; to wit , that *Archimedes* had either neglected or purposely omitted many other things , which have since his time been treated by others ; or else it must be , that what he wrote thereof , hath perished by the injury of time , The like he did when he treated of the *Center of Gravity in Plains* ; for he omitted the Tract of the *Center of Lines* . And as that objection deterred me not from enquiring the Center of Gravity in Lines , especially Circular ones , so here I encouraged my self in hope to discover something new concerning *Spirals* , which hitherto had escaped both *Archimedes* and all that had come after him .

And truly in my opinion I began the busines happily enough , and had made

made a great progress therein ; but on a sudden when I was half way on my Voyage, and came within Kenning of the Port, I was fain to strike Sail ; and for security, to make directly towards the shore : for I then first lighted on a certain *Examen* of the Dimension of the Spiral Line , performed by numbers : whereof indeed, I had heard before , but could not tell how or which way that Dimension proceeded : or whether that Spiral were to be compared with a right Line or crooked, or a pure Circular Line. So far was I from suspecting, that the exact proportion I had already discovered , could be disproved thereby. So that I was nothing at all troubled at the first sight of this *Examen*, as being very confident of my own Demonstrations, both Geometrical and Arithmetical, which I thought to be irreprehensible. Yet I had often heard, that an enemy, how mean soever he seems, ought not to be contemned ; for when we least think of him , he may hap to stand in our way , if not do us a mischief.

I took in hand therefore to examine  
F 2 that

that *Examen*, promising my self to discover a thousand errors in his Calculation, rather then one in my own Inventions. But it happened far otherwise; for I found that the *Spiral Line* of the first Revolution was greater then the Semi-circumference of the first Circle: so that I saw I was fairly

\* See how unjustly Mr. *White* charges this Author of obstinacy, for not confessing his error.

to submit. \* For what should I do? Should I dissemble the matter? Should I hold my peace and conceal it? Or should I, with those Squarers of the Circle above-mentioned, obstinately defend my own Assertion, though I knew it to be false? Should I dare to question, accuse, yea and condemn *Archimedes* and *Euclide* himself, to maintain my own opinion? By no means. I resolved therefore to observe the Rule, which *Joseph Scaliger* once prescribed to himself, but never observed. It is in the *Appendix* to his *Cyclometriques*; where he thus speaks.

"I grant, saith he, that in all other Arts and Sciences, error may be tollerably committed oftentimes: but in the Mathematiques it ought not so much as once. For as an old Writer saith, Πάντα τέρη μεθοδεύμενα αδιαμάγντον, &c. All things digested by

" by Art ought to have an unprove-  
 " able evidence. So that a Mathe-  
 " matician observing his own error,  
 " ought before all others to cry out,  
 " 'Tis I, 'tis I, here I am that did it.  
 " But if he comes to know it by means  
 " of some other person, unless he  
 " presently gives thanks to his Cor-  
 " rector, he is ill-deserving towards  
 " the man; but if he do not presently  
 " amend his error, he wrongs the  
 " Science it self. Yet this honest *Scaliger* was so far from correcting his  
 own over-sights, published both in  
 black and red, that with greater igno-  
 rance and animosity he still obstinately  
 defended them. I concluded therefore  
 with my self, that something was amiss  
 in my Deductions. But where this  
 Snake(the error) lay, I could neither  
 so easily nor so presently perceive.  
 Wherefore I gave these my Writings  
 to a Friend well skilled in the Mathe-  
 matics to read them over; entreating  
 him to consider as attentively as he  
 could, whether they were consistent or  
 not; and that he would impart his  
 judgement of them to me with all  
 candour and clearness.

But to tell you the plain truth, while my Friend deferred somewhat the pains of reading my Writings, I in the mean time discovered the error my self, and was able (as the Proverb saith) to point it out with my finger. Onely I could not well resolve, whether I should now wholly lay aside the foregoing Chapter, (seeing that to do so would not be any prejudice to my principal intent, as on the other side it would not have added much to it, though every thing therein had proved true) and so dissemble the whole matter concering the measuring of the *Spiral Line*; or otherwise should publish whatsoever I had written on that Subject, together with this *Examen*. Many and various Reasons occurred to me *Pro* and *Con*: but at last those prevailed,

\* See if this Authors not expunging his error proceeded out of pride, as he is accused.

\* good of others inclined me to think that some part at least even of those my Labours, was not to be denied to the publick. Especially seeing there wanted not the examples of Authours, who to their own praise, and the benefit of their Readers have done the like; who though they should hap-

happen to reap no other profit by it, yet were this alone sufficient, that they have here a *Caveat* given them, that in case they should themselves desire to search more curiously into this Subject of *Spiral Lines*, or any other of like nature, they should proceed warily and advisedly in the † business, † Where is now that great vanity Malter White would pin upon this Author?

And lastly, that *Geometry* it self, even according to the judgement of the same *Joseph Scaliger*, (cap. 1. prop. 4. num. 7.) should rejoice, being enriched thereby with the Addition of some New Endeavours.

The first thing therefore here to be done is to declare, how I came to know that my Inventions were but doubtful and uncertain; next to shew where the error lyes; and lastly to examine all the severall Propositions, with approbation or rejection of them according to their merits; yea (where it may conveniently be done) by rectifying and correcting those which are erroneous. Yet many things I have omitted, though already written,

and digested by me into due order and method; which had they been built upon good and solid grounds, would have given great delight to the Reader. But finding them loose and slippery, (to avoid offence) I have justly laid them aside. However, it might (perhaps) be matter not unworthy our consideration, to think what manner of Bending Line that is, (and also how it may be compendiously drawn, and described) which might be found to have all those properties, which in the *Spiral Line* we have hitherto but vainly sought. But that's a thing I must defer to some other time, or rather leave to other persons to perform.

## The First Proposition.

More particularly to declare the occasion of this following *Examen*, and of Doubting.

**T**HAT there was one, who before me had attempted the measuring of the *Spiral Line*, I remember well to have heard long since from the mouth of *Father Hierome Kinig*, a Mathe-

Mathematician of our Society, and formerly a most accurate professor of those Sciences in the Universities of *Ingolstadt*, *Dillingen*, and *Prague*; whom I knew very well both at *Rome* and elsewhere; yea, that the abovesaid person had affirmed (but without any Demonstration given) that the said *Spiral Line* was exactly equal to some other Line: which Assertion of his the said professor did also examine. But to what Line he made the *Spiral* to be equal, I cannot possibly call to minde, whether I did either then, or any other time know it in all my life. Whilst therefore I was writing the precedent Chapter, I hapned to think on the afore mentioned *Examen*; yet rememberring it but confusedly, and in gross. Whereupon being at *Gratz* in *Stiria*, I wrote to *Vienna* where the said Mathematician then was, and entreated him, that if he had any thing of this Subject, he would send it in writing to me; not that I was then any way jealous of my self, or did in the least measure doubt of my own writings and discoveries; but onely that I might communicate what I had

writ-

written, with those of my own profession. He forthwith yielded to my request, and sent me this following *Examen*, or rather refutation of the things I had asserted; which having my self examined, (as I said before) I manifestly found it agreeable to truth. Now that which he wrote was as followeth.

2. The second Proposition may be to shew, that the *Spiral Line* is greater then the Semi circumference, to wit, the Semi-circumference of the first Circle that contains it.

Though I had here ended my additional Vindication of a worthy Mathematician by the name of *Gulden*, because I found him so written by the Author of the precedent Letter, as following Mr. *White*, who names him *Paulus Guldenus*; yet I thought it not amiss to advertise the Reader before I took Pen from Paper, that his Adversary could not be ignorant that he calls himself *Paulus Guldinus* in his own printed works, not *Guldenus*. Whereby one may probably conjecture, that this was a meer affected mistake

stake in Mr. *White*, to confirm his Reader in the belief of that incredible story he delivers, that he had never either seen, nor heard of this Authors Work, till his own was ready for the Press.

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FINIS.

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